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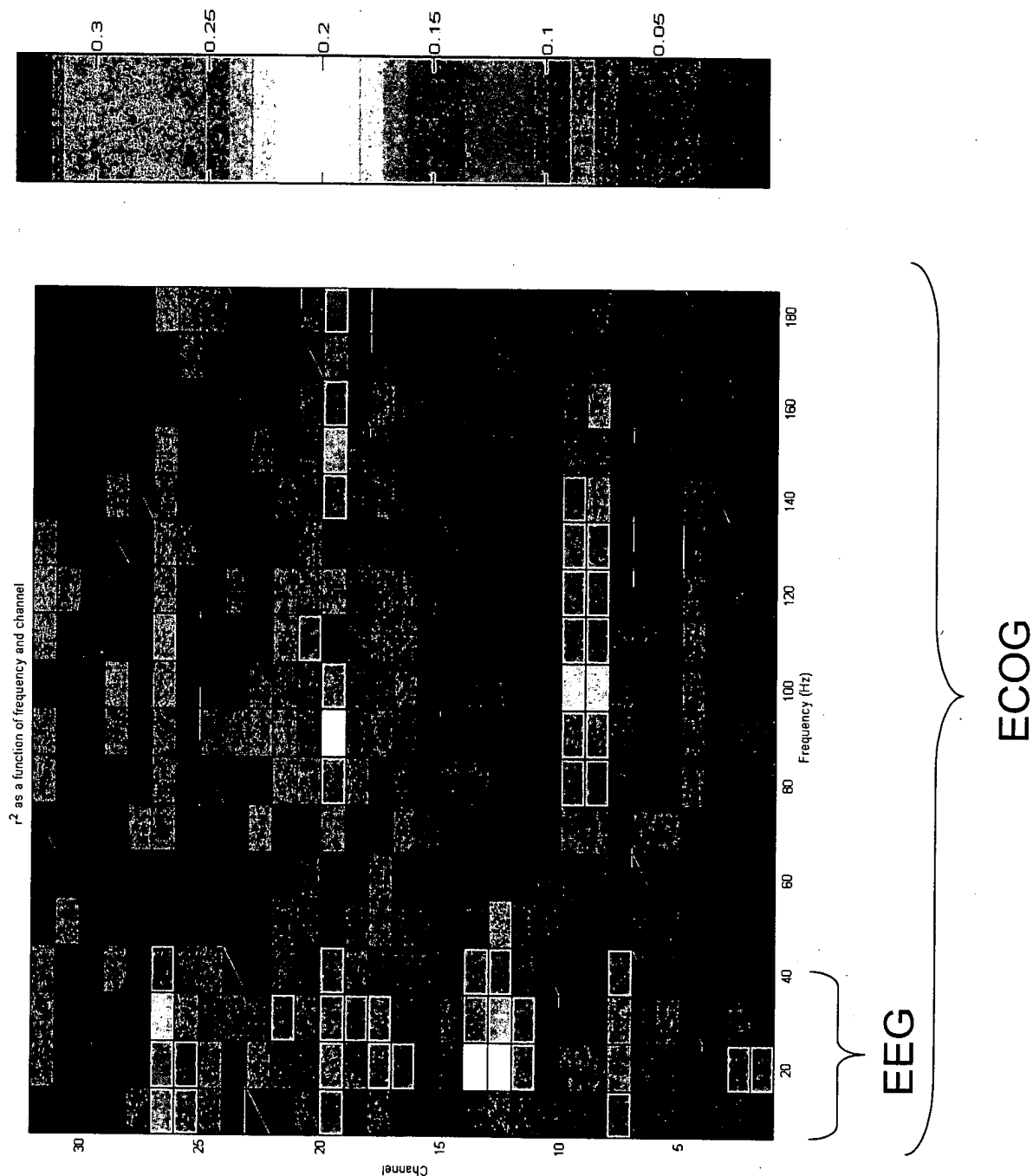
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# Figure 1



# Figure 2: BCI schematic

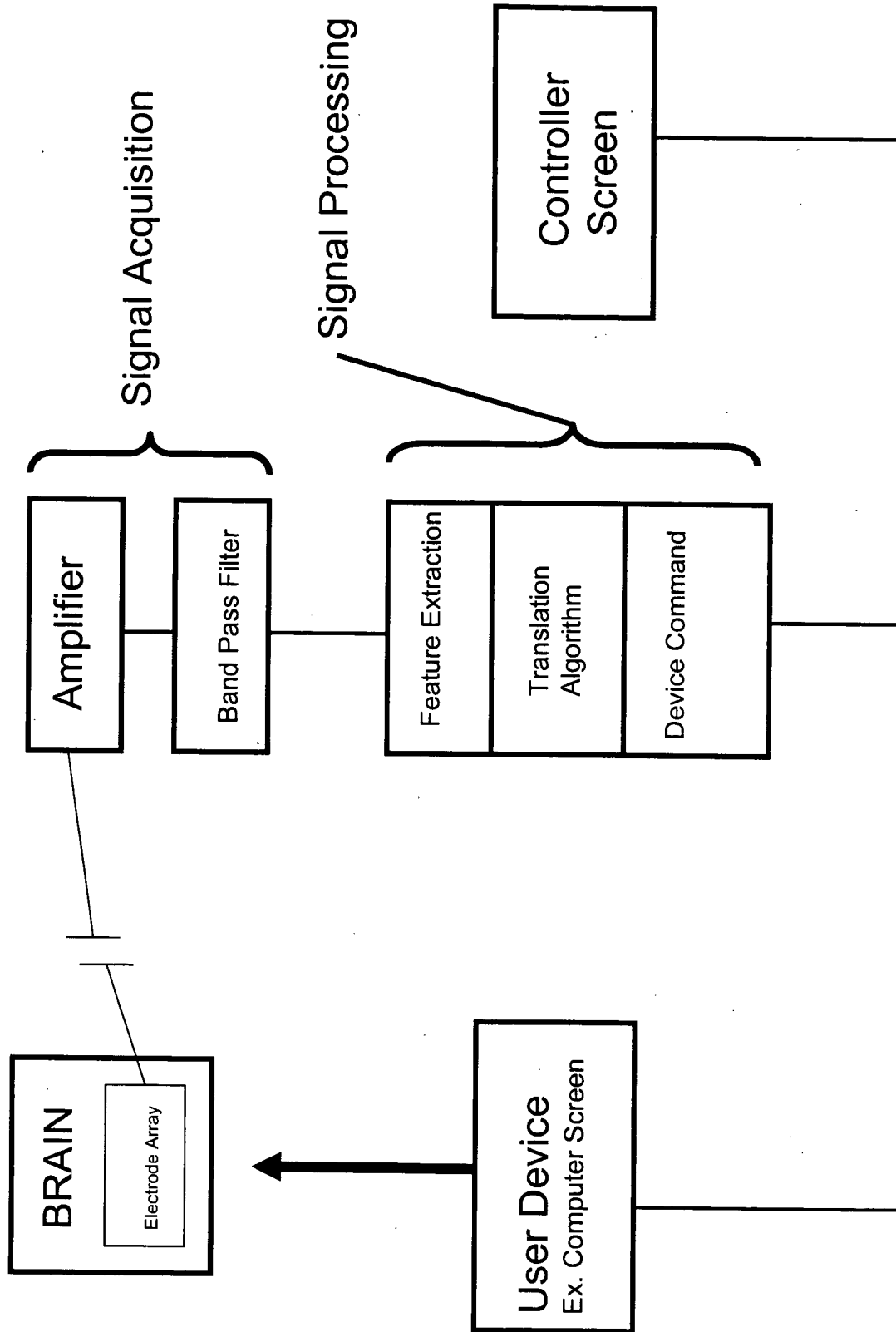
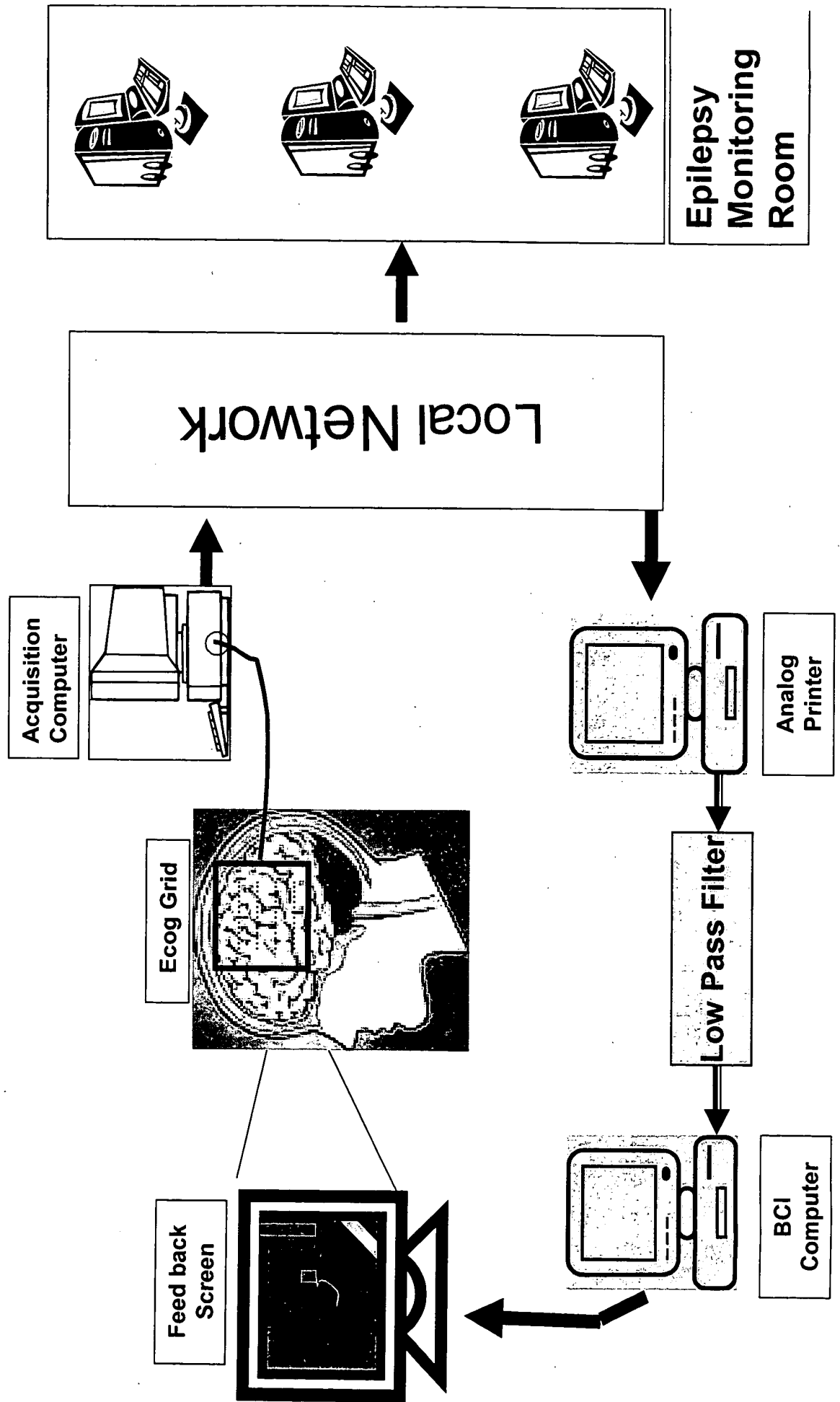


Figure 3a. Ecog BCI - System



# Figure 3b. ECOG BCI system

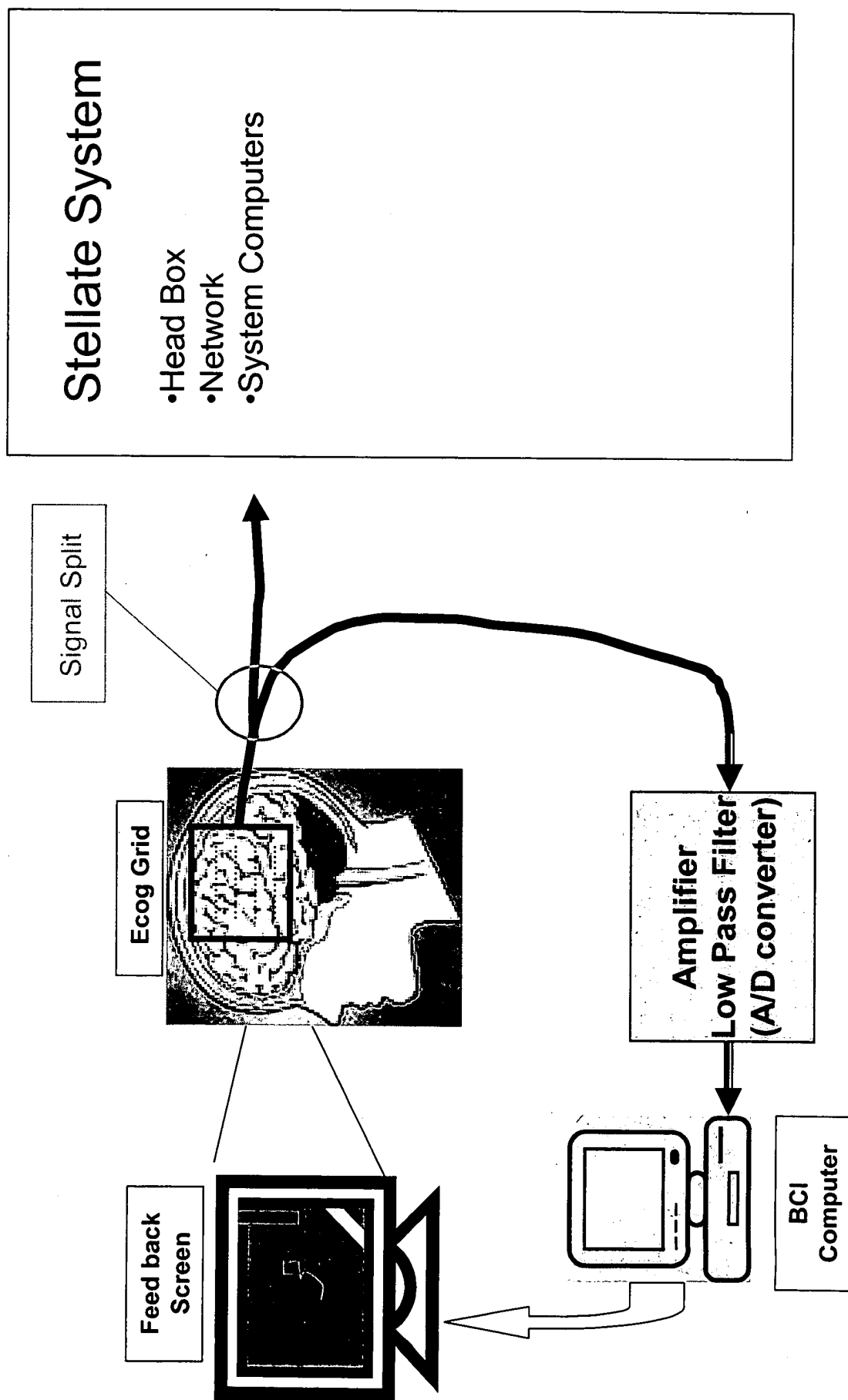
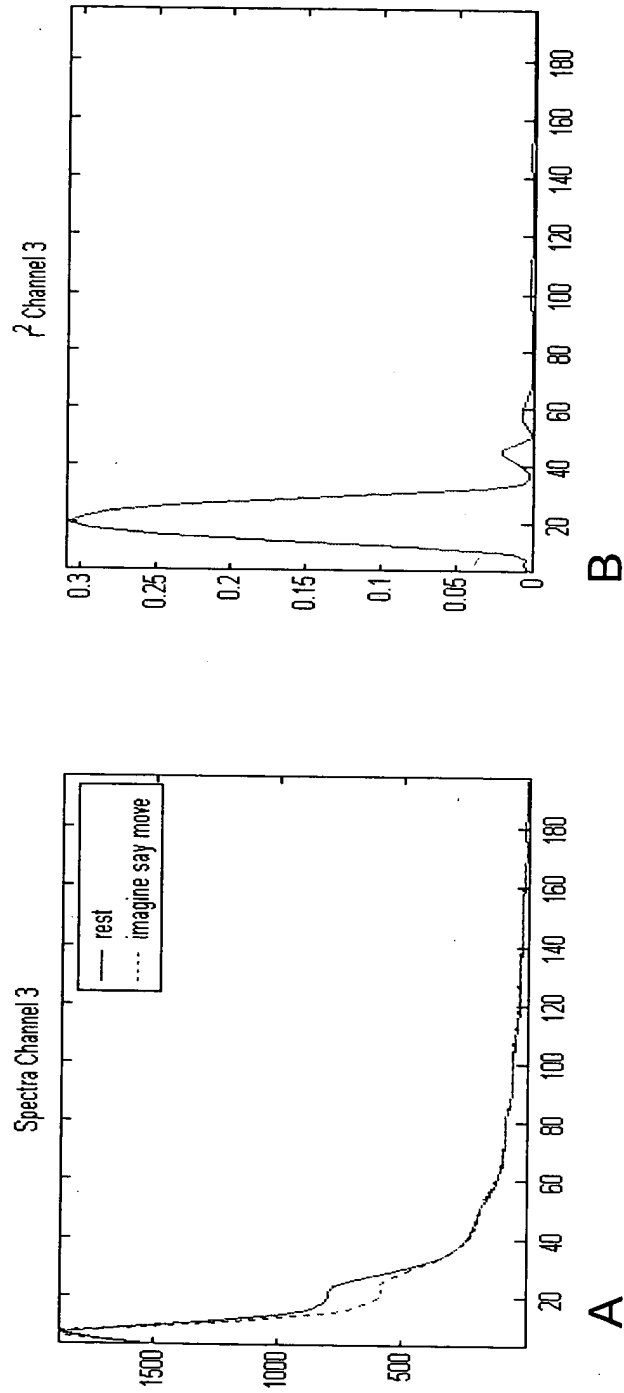


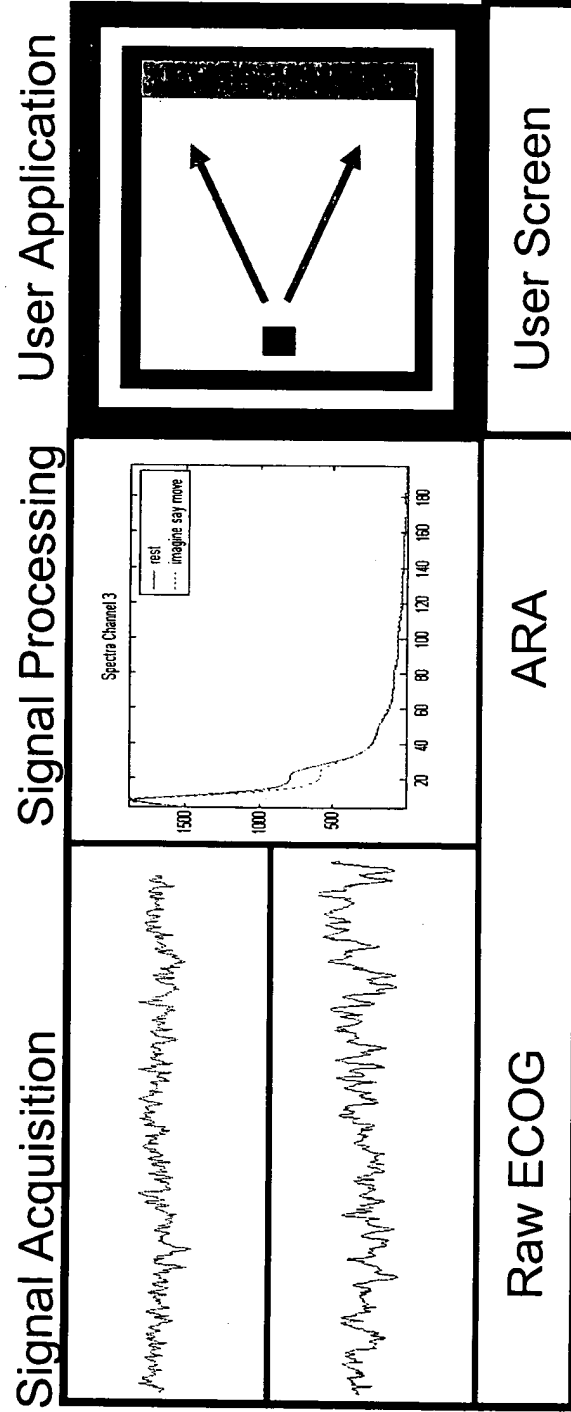
Figure 4



# Figure 5



# Figure 6

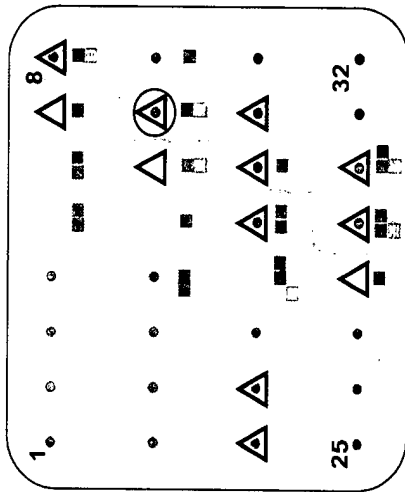


Condition 1. Imagine Saying Move, directs cursor upwards  
 Condition 2. Rest, directs cursor downward



# Figure 7

BB



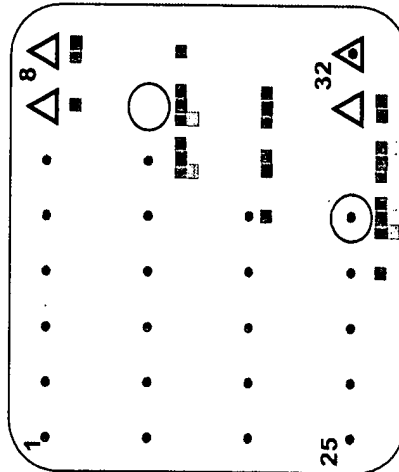
△ Stimulation:

- 7,8: thumb twitching
- 14,15: jaw twitching
- 21,22,23,28,29, 30: tongue retraction
- 17,18 Speech Arrest

○ Closed Loop Electrodes:

- 15: Imagine open & closing right hand

DD\*



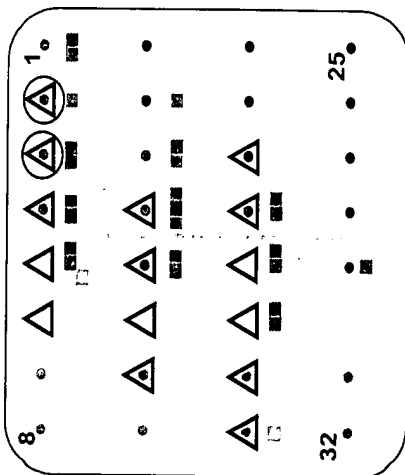
△ Stimulation:

- 7,8: right facial twitching
- 31,31: jaw twitching

○ Closed Loop Electrodes:

- 15,29: Say the word "move" & imagine saying the word "move"
- 29: Tongue protrusion & imagined tongue protrusion

AA



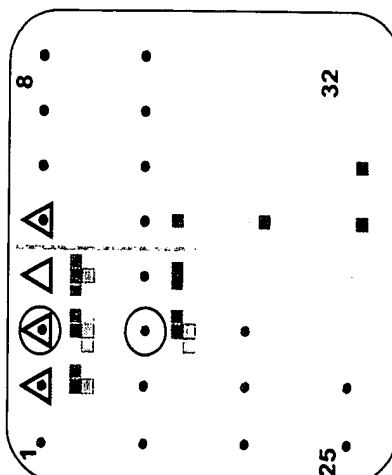
△ Stimulation:

- 2,3: right thumb tingling
- 4,5,6, 12, 13: facial twitching and tongue retraction
- 19,20, 21: tongue retraction
- 14, 15: forearm supination
- 22,23,24: speech arrest

○ Closed Loop Electrodes:

- 2,3: Open & closing right hand

CC\*



△ Stimulation:

- 2,3,4,5: tongue retraction

○ Closed Loop Electrodes:

- 3,11: Imagine saying the word "move"

## Anatomic Electrode Position

- Temporal Lobe
- Parietal Lobe
- Prefrontal
- Premotor
- Sensorimotor
- Broca's Area

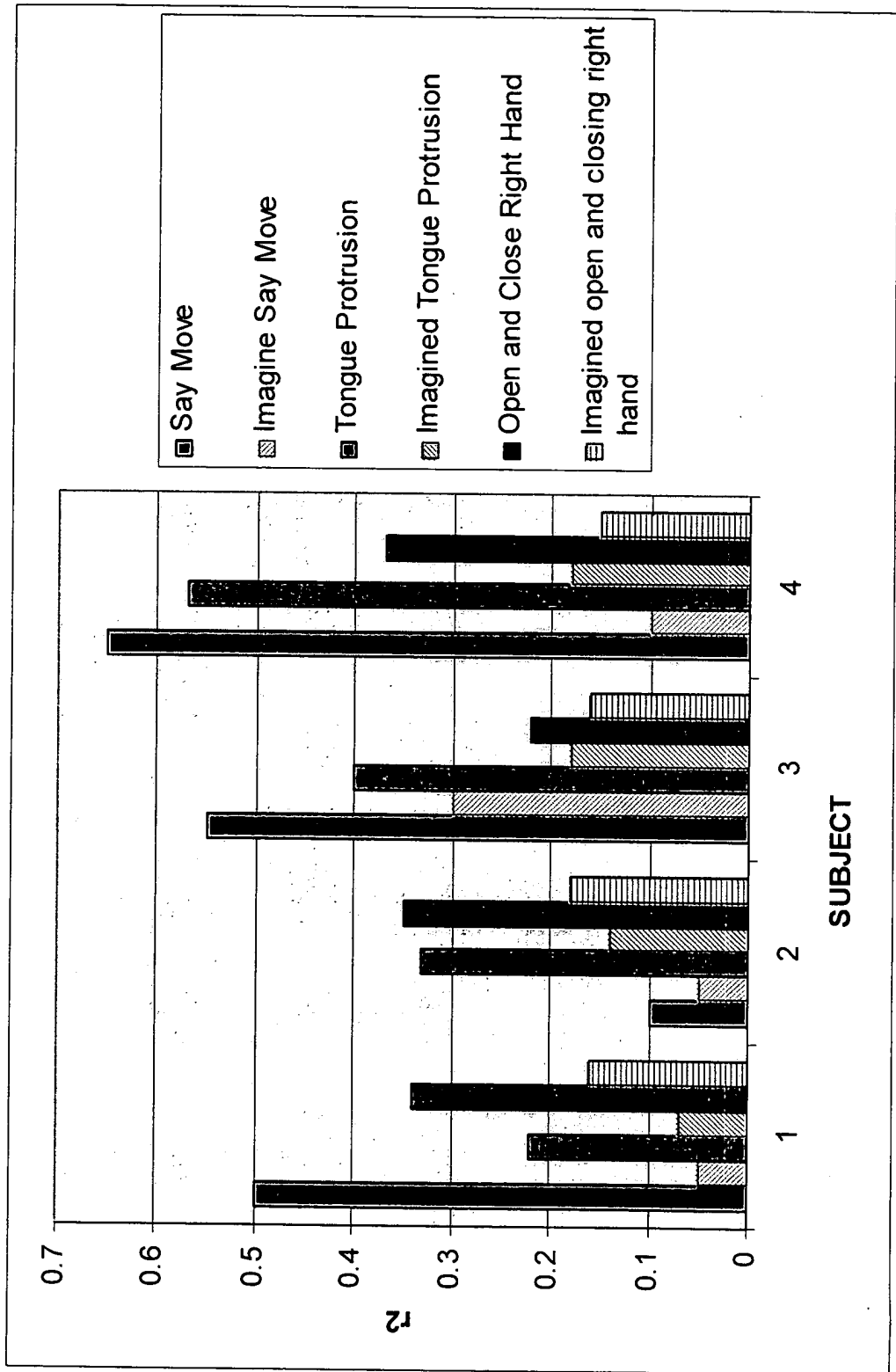
## Trained Task Producing Activation

- Opening and closing right hand
- Imagine opening and closing right hand
- Protrude tongue
- Imagine protruding tongue
- Say the word "move"
- Imagine saying the word "move"

★ Patients with speech function localized to right hemisphere

----- Central Sulcus

Figure 8



# Figure 9

## Prediction of Final Cursor Position

Patient	Self		# trials	1st half->2nd half		interlaced	
	$r^2(x)$	$r^2(y)$		$r^2(x)$	$r^2(y)$	$r^2(x)$	$r^2(y)$
Patient DD: 4 targets	0.61	0.57	556	0.45	0.45	0.54	0.49
Patient DD: 8 targets	0.65	0.26	924	0.50	0.06	0.59	0.10
Patient BB: 4 targets	0.47	0.45	326	0.02	0.14	0.13	0.11

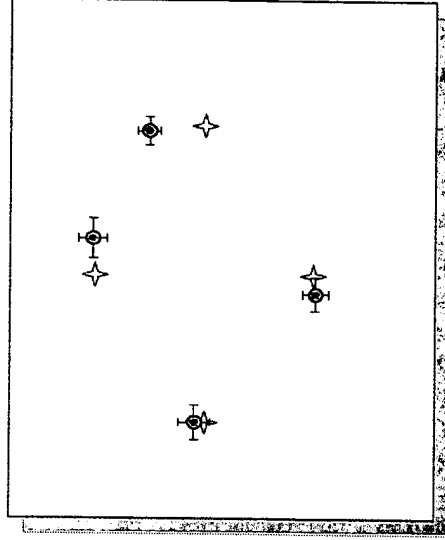
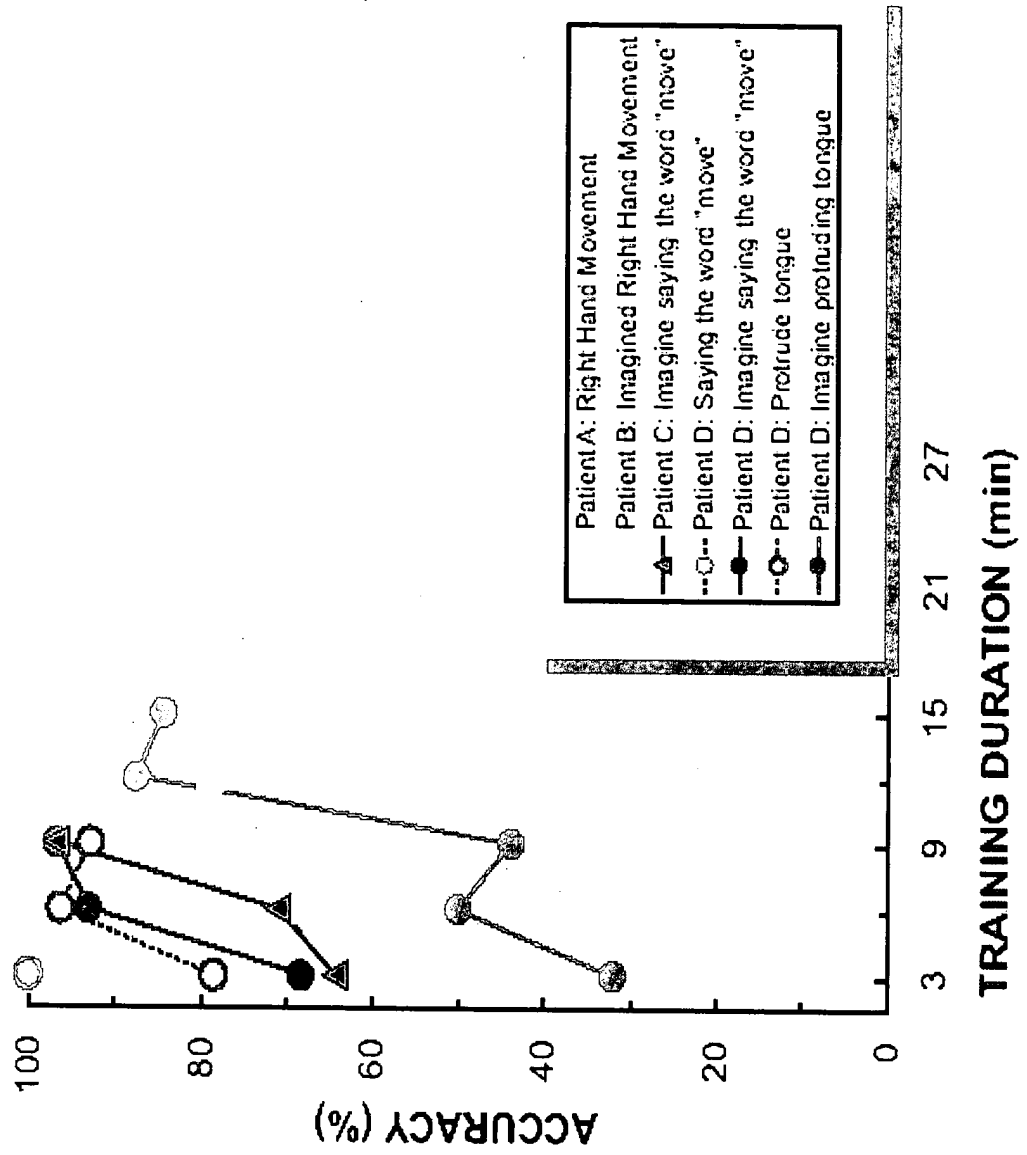
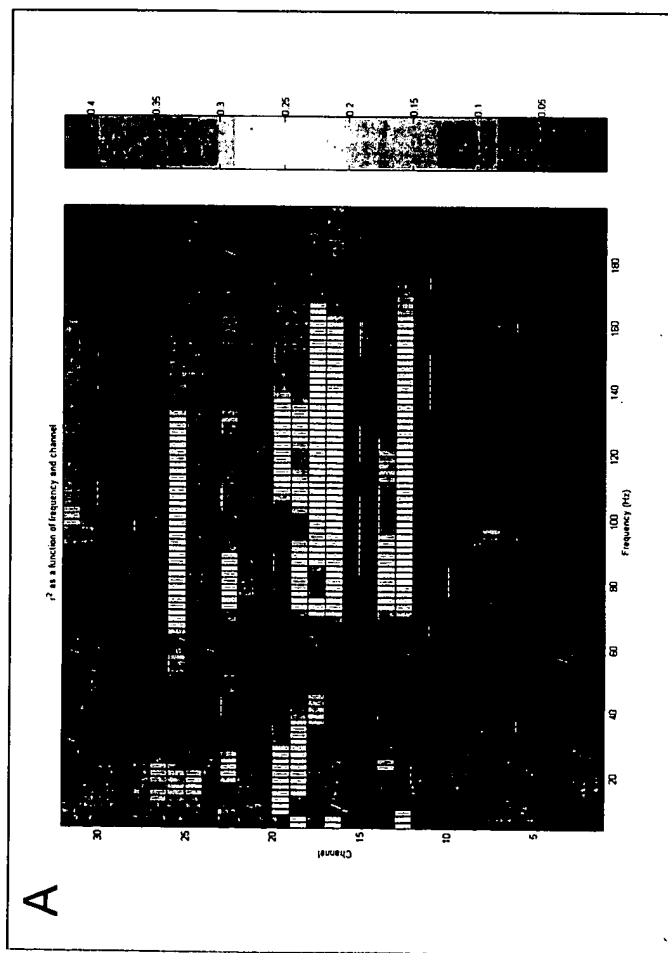


Figure 10

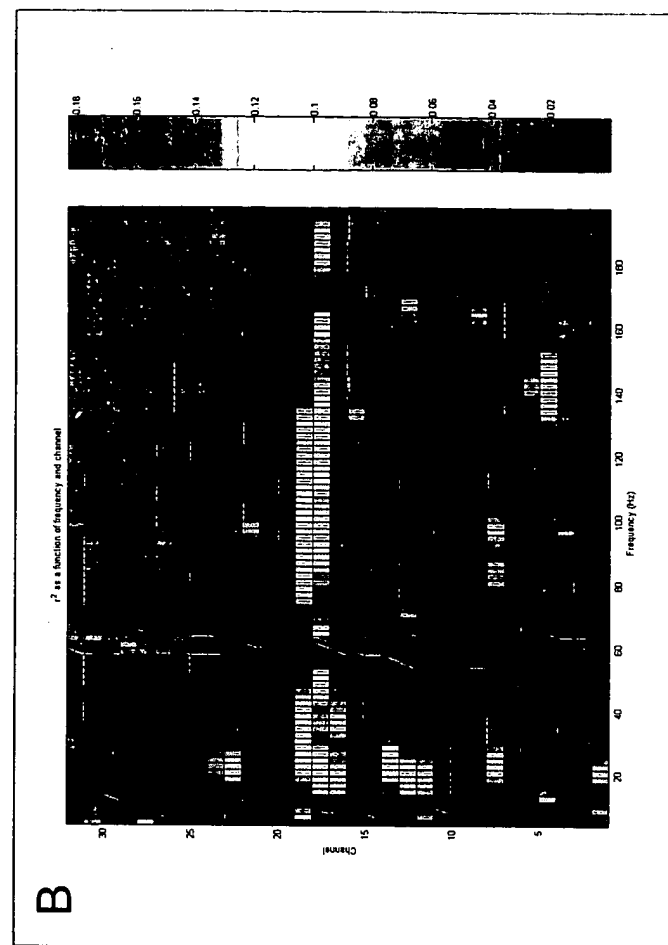


# Figure 11

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Middle Finger



Thumb

Figure 12: Analysis of Motor Speech

